Claim Set as Amended

1. (Currently Amended) ~~An error correction encoding method conducted in a digital data writing apparatus when recording data to~~ A method for processing digital data for use with a storage medium, comprising the steps of:

arranging ~~said~~ sequential input digital data so as to form a plurality of data blocks of a predetermined matrix form~~, said plurality of data blocks being formed sequentially~~;

appending outer parity of a predetermined size and inner parity of a predetermined size to each column and row of each of said plurality of data blocks, respectively, thereby forming one ECC (Error Correction Code) block to perform an error correction on ~~the basis of~~ the ~~one~~ ECC block;

reordering rows including the outer parity so as to insert said rows including the outer parity separately into other rows including no outer parity, for each of said plurality of ~~encoded~~ data blocks in said appending step; and

writing rows in the same order in said plurality of data blocks re-arranged in said reordering step, to the storage medium sequentially on row-by-row basis.

2. (Previously Presented) The method according to claim 1, wherein in said arranging step, each of said plurality of data blocks is formed by using the following equations:

$$i=b/X \text{ and}$$

$$j=b-(X\times i),$$

where i and j ($0 \leq i \leq (Y-1)$ and $0 \leq j \leq (X-1)$) represent row and column position in each data block of (X×Y)-byte size, respectively,

where b ($0 \leq b \leq (X \times Y)-1$) represents an order in which the bytes in said sequential input data of (X×Y)-byte size are inputted, and

where X and Y are integers greater than 1.

3. (Previously Presented) The method according to claim 2, wherein X is 172 and Y is 192.

4. (Currently Amended) The method according to claim 3, wherein said outer parity is 16-byte long in each column and said inner parity is 10-byte long in each row.

5. (Previously Presented) The method according to claim 1, wherein said appending step comprises of the sub-steps of:

appending said outer parity of a predetermined size to each column of each of said plurality of data blocks in the column direction; and

appending said inner parity of a predetermined size to each row of each of said plurality of data block outer-parity-encoded in said outer parity appending step in the row direction.

6. (Previously Presented) The method according to claim 1, wherein in said

writing step, said plurality of data blocks include N (N≥2) data blocks, each being (J×K)- bytes in size, and a byte at (R(i), C(i)) of the i-th data block is selected and written to said storage medium based on the following equations:

S=R(i)×(J×N)+C(i)+J×(i-1), where (R(i), C(i)) (0≤R(i) ≤ (K-1) and 0≤C(i) ≤ (J-1)) represents row and column position in the i-th data block, and s (0≤S≤ (J×K×N)-1) represents an order in which bytes in all data blocks sequentially are written to said storage medium.

7. (Previously Presented) The method according to claim 6, wherein J is 182 and K is 208.

8. (Currently Amended) ~~An error correction encoding method forA method for processing digital data for use with~~ a storage medium, comprising the steps of:

arranging a sequential input digital data so as to form a pair of data blocks of a predetermined matrix form, ~~said pair of data blocks being formed sequentially, wherein in said arranging step,~~ each of said pair of data blocks is formed by using the following equations:

i=b/X and

j=b-(X×i),

where i and j (0≤i≤ (Y-1) and 0≤j≤ (X -1)) represent row and column position in each data block of (X×Y)-byte size, respectively,

where b ($0 \leq b \leq (X \times Y) - 1$) represents an order in which the bytes in said sequential input data of (X×Y)-byte size are inputted, and

where ~~X is 172 and Y is 192X and Y are integers greater than 1~~; and

appending an outer parity of a predetermined size and an inner parity of a predetermined size to each column and row of each of said plurality of data blocks, respectively, thereby forming one ECC (Error Correction Code) block to perform an error correction on ~~the basis of~~ the ~~one~~ ECC block.

9. (Currently Amended) The method of claim 8, further comprising:

interleaving rows including ~~the~~ outer parity separately ~~at a position after a predetermined row into the other rows including no outer parity~~ for each of said pair of ~~encoded~~ data blocks in said appending step.

10. (Currently Amended) The method of claim 9, further comprising:

writing rows in the same order in said pair of data blocks re-arranged in said interleaving step to the storage medium sequentially on row-by-row basis ~~after modulating the digital data by a predetermined modulation algorithm~~.

11.(Currently Amended) The method of claim ~~8~~10, wherein ~~X is 172 and Y is 192~~the predetermined modulation algorithm converts 8 bits to a given bit, the given bit being larger than 8 bits.

12. (Currently Amended) The method of claim 11, wherein said outer parity is 16-byte long ~~in each column~~ and said inner parity is 10-byte long ~~in each row~~.

13. (Currently Amended) The method of claim 8, wherein said appending step comprises of the sub-steps of:

appending said outer parity of a predetermined size to each column of each of said pair of data blocks in the column direction; and

appending said inner parity of a predetermined size to each row of each of said pair of data blocks outer-parity-encoded in said outer parity appending step in the row direction.

14. (Currently Amended) ~~A method for processing digital data for use with a storage mediumAn error correction encoding method~~, comprising the steps of:

arranging a sequential input digital data so as to form a pair of data ~~blocks~~ units of a predetermined matrix form, ~~said pair of data blocks being formed sequentially and~~ each data ~~block unit~~ having size of 172×192 bytes;

appending an outer parity of a predetermined size and an inner parity of a predetermined size to each column and row of each data ~~blockunit~~, respectively; and

combining each data ~~blockunit in wherehaving~~ the ~~appended~~ outer parity and ~~the~~ inner parity ~~are appended~~, thereby forming one ECC (Error Correction

Code) block to perform an error correction on ~~the basis of~~ the ~~one~~ ECC block.

15. (Currently Amended) The method of claim 14, further comprising:

~~re-ordering~~interleaving rows including the outer parity ~~so as to interleave said rows including outer parity~~ separately ~~into the other rows including no outer parity at a position after a predetermined row~~ for each data ~~block unit~~ in said combining step.

16. (Currently Amended) The method of claim 15, further comprising:

modulating the digital data ~~in by~~ a predetermined modulation algorithm;[[,]] and

writing the modulated data of rows in the same order in said pair of data ~~blocks units~~ re-arranged in said ~~reordering~~ interleaving step, to the ~~a~~ storage medium sequentially on row-by-row basis.

17. (Currently Amended) The method of claim 16, ~~further comprising:~~

~~wherein the writing step includes a step of~~ appending a predetermined sync code to the modulated data in the modulating step, and then performing the writing step of writing the sync code and the modulated data.

18. (Currently Amended) The method of claim 17, wherein the predetermined sync ~~code codes~~ of 4 columns ~~is are~~ appended within the ~~re-~~

~~arranged one~~ ECC block before the writing step.

19. (Currently Amended) The method of claim 14, wherein ~~16 rows including~~ said outer parity ~~is 16 bytesare appended to each data unit~~ and ~~10 columns including~~ said inner parity ~~is 10 bytesare appended to each data unit~~.

20. (Previously Presented) The method of claim 19, wherein one ECC block consists of 364×208 bytes.

21. (New) A storage medium having a data structure of ECC (Error Correction Code) block for an error correction,

wherein the ECC block is constructed by arranging a sequential input digital data so as to form a pair of data units of a predetermined matrix form, appending an outer parity of a predetermined size and an inner parity of a predetermined size to each column and row of each data unit, respectively, and combining each data unit having the appended outer parity and inner parity, thereby forming one ECC block to perform an error correction on the ECC block,

wherein each row including the outer parity separately is interleaved at a position after a predetermined row for each data unit, the digital data of each data unit is modulated by a predetermined modulation algorithm, and the modulated data of rows is recorded in the same order in said pair of data units sequentially on row-by-row basis.

22. (New) The storage medium of claim 21, wherein the arranged each data unit has size of 172×192 bytes respectively.

23. (New) The storage medium of claim 21, wherein a predetermined sync code is appended to the modulated data, and then the sync code and the modulated data are recorded together.

24. (New) The storage medium of claim 23, wherein the predetermined sync code of 4 columns is appended within the ECC block before the recording of the modulated data.

25. (New) The storage medium of claim 21, wherein 16 rows including said outer parity are appended to each data unit and 10 columns including said inner parity are appended to each data unit.

26. (New) The storage medium of claim 25, wherein one ECC block consists of 364×208 bytes.